Eastern Bengal," he produced a work of considerable interest and authority, which at once attracted the attention of European scholars. He admitted that this work was only provisional and that it was merely "circulated for criticism"; but he had no opportunity for the preparation of a revised edition. Under the guidance of the late Sir W. Flower he mastered the principles of craniometry, and his receptive mind familiarised him with the general problems of ethnography and their bearing on the special conditions of the Indian races. Appointed director of the Ethnographical Survey in 1901, he suggested a scheme for research which, for reasons of finance, was rejected. On a limited scale it was sanctioned by the Government of Lord Curzon, and is now in progress in certain provinces.

Risley's reputation as an anthropologist must depend upon his account of the Bengal tribes and castes, and the chapters on caste and race contributed to the report on the census of India of 1901, conducted under his supervision. The latter was a remarkable *tour de force*, considering that it was written amidst the pressure of other arduous duties. In this class of work his lucid style and grasp of principles enabled him to present in an attractive form the results of the researches into Indian anthropology and sociology made by his assistants and himself. Had he lived longer he would probably have revised some of the theories advanced in his census report, which, with some modifications, was re-issued under the title of "The People of India." In particular he must have realised that craniometry alone is a slippery foundation for an analysis of the complex of Indian races; that he was mistaken in denying the influence of the Scythian and Hun invasions, particularly in relation to the origin of some of the Rajput tribes; and that his scheme of classification to some extent ignored the influence of environment, and the confusion of groups resulting from long ages of internal war and social disorganisation. But in his skilful account of the caste system and its working his powers of systematisation, aided by considerable literary ability, are fully displayed.

It may be feared that he was unable to complete a work on the people of eastern Bengal, which was announced for publication soon after his retirement from India. But he has left enough to show that, with more opportunity for personal study of the people and more leisure for examination of the material which he had collected, he might have attained a scientific reputation even higher than that to which he attained. Besides his published work, the initiation of the Ethnographical Survey of India is the best memorial of his services to the cause of science.

NOTES.

A MEETING of the International Commission on Mathematical Teaching was held at Milan on September 18–21, Prof. F. Klein presiding. The main subjects discussed were:—(1) The question of rigour in teaching mathematics, especially geometry. It appears that of European countries Italy is the most wedded to rigorous methods, while Germany and Austria stand at the other end of the scale, and admit intuitive methods freely. France and England adopt a middle course, France inclining toward the Italian practice and England toward the German. It was agreed that Euclid does not satisfy modern standards of mathematical rigour. (2) The question of "fusion," *e.g.* of geometry with algebra, of plane with solid geometry, of geometry with trigonometry, of solid geometry with descriptive geometry, of analytical with geometrical conics, of differential with integral calculus. (3) The provision of mathematical instruction for students of such subjects as chemistry, biology, and economics. Such courses were at one time provided in French universities, but are now entrusted to the schools. In other countries there does not appear to be any systematic provision of this kind. The reports issued by the various national subcommissions were presented; of these, the French reports are now complete; eight of the thirty-four English reports have been issued by the Board of Education (Wyman and Co.), and a large amount of literature has been issued by the German subcommittee, whose labours, however, will not be completed for two years more. Arrangements were made for the educational subsection at the International Mathematical Congress to be held at Cambridge (England) on August 22–28, 1913. A full report of the Milan meeting will be published in due course in *L'Enseignement Mathématique*.

THE summary of the weather for the first nine months of the present year, which has just been issued by the Meteorological Office, shows that the temperature for the period was in excess of the average over the entire area of the British Islands, the excess being greatest over England. The rainfall was everywhere deficient, the deficiency amounting to 7·20 inches in the north of Ireland, to 6·71 inches in the Midland counties, and to 6·20 inches in the south-west of England. In the south-east of England, which district embraces London, the deficiency of rain for the nine months amounts to 5·57 inches. Over the north of England the deficiency is little more than 2 inches, and in the north of Scotland it is only 0·05 inch. The largest aggregate rainfall for the nine months is 35·58 inches, in the north of Scotland, the least 11·94 inches, in the Midland counties. Rain fell on 163 days in the north of Scotland, but only on 97 days in the south-east of England. There was an excess of sunshine in the nine months over the entire kingdom, the greatest excess being 334 hours, in the south-east of England. The greatest aggregate duration of sunshine for the nine months is 1799 hours, in the Channel Islands, but it was very little less in the south-east of England, where the aggregate duration was 1720 hours. In the north of Scotland it was only 1116 hours. The summary for September shows that it was only in the English districts that the temperature was in excess of the average. The rainfall for the month was deficient over the entire kingdom, except in the north-east and north-west of England and in the south of Ireland. The sunshine was again in excess of the average over the entire country. At Greenwich the mean temperature for the month was 61°, which is 3° in excess of the average; the temperatures in the early part of the month beat all previous records, both for the absolute readings and for the mean of the period. The total rainfall for the month was 1·34 inches, which is 0·85 inch less than the average, and rain only fell on eight days. The sun was shining for 222 hours, which is nearly 70 hours more than the normal.

SIR THOMAS CROSBY, who has been elected Lord Mayor of London for the ensuing year, is the first medical man to occupy that office (though his term will be the 723rd Mayoralty of the City), and is probably the oldest citizen upon whom the honour has been conferred, his age being eighty-one. He took the degree of M.D. at St. Andrews University in 1862, after being in practice for ten years, and filled the office of president of the Hunterian Society in 1871. He is a member of the Senate of the University of London.

NEW regulations for the sale of mineral acids have now come into force. They have been made by the Privy

Council with the object of preventing the misuse of sulphuric, nitric, and hydrochloric acids. These acids, and also salt of lemon, must now only be sold by retail in bottles, distinguishable by touch from ordinary bottles, and bearing on a label the name and address of the seller, together with the words "Poisonous" and "Not to be taken." Ammonia will also be subject to the same regulations in four months' time.

THE popular science lectures which are given at the Royal Victoria Hall, Waterloo Road, S.E., every Tuesday evening from October to May, will commence on Tuesday, October 10, when Prof. W. Flinders Petrie, F.R.S., will lecture on "Life in Egypt 2000 Years Ago." Other lectures during this month are:—October 17, "The Modern Gun and Armour Plate," J. S. S. Brame; October 24, "Seeing Canada," Miss A. D. Cameron; and October 31, "Mountaineering," Mr. H. V. Reade.

WE notice with regret the announcement of the death, on September 26, of Mr. G. C. Donington, senior chemistry master at the City of London School. Mr. Donington was for a time demonstrator in chemistry at the Central Technical College, South Kensington, and was afterwards successively science master at Highgate School, Christ's Hospital, and Leeds Grammar School before his appointment to the City of London School. He was the author of a laboratory manual entitled "Practical Exercises in Chemistry," issued in 1906, and of a helpful "Class-book of Chemistry," published a few months ago. His death at the early age of thirty-seven will be deeply regretted by many friends and pupils.

AN investigation of the disease known as "sprue" is to be undertaken by the London School of Tropical Medicine. It is hoped that funds to the amount of 1000*l.* will be available for this purpose, of which the Government of Ceylon has provided 750*l.*, and the remainder will probably be subscribed by the Ceylon Tea Planters' Association. It has not yet been decided what representative of the school will undertake the investigation. The disease occurs in Ceylon, Malaya, Indo-China, China, and other districts, and is of considerable importance, causing a large amount of sickness and disability, and in some instances a fatal issue. At present little is known of the causation of the malady.

IT is proposed to erect a memorial to Mungo Park and Richard Lander. A committee has been formed consisting of Lord Curzon, Sir George T. Goldie, Lord Scarbrough, Major Leonard Darwin, Sir Walter Egerton, and Sir Hesketh Ball to take the necessary steps to secure funds for this purpose. Both explorers have been honoured in their native towns of Selkirk and Truro, but no record of any kind exists in the land to which their lives were consecrated and sacrificed. In appealing for support, the committee remarks:—"As the main object of their travels was to discover where the Niger joined the ocean, the most suitable site would seem to be its principal ocean port. It is therefore proposed to erect an obelisk of similar design and dimensions to Cleopatra's Needle on a projecting point of land at Forcados, where it would both attract general attention and serve as a landmark to vessels approaching the port. The total cost is estimated at 2000*l.*, exclusive of the foundations, which it is understood will be undertaken by the Government of Southern Nigeria." Donations may be sent to the honorary treasurer of the fund, Dr. J. Scott Keltie, 1 Savile Row, London.

THE new session of the Royal Geographical Society will be opened on November 6, when Dr. Nansen will read a paper on the Norsemen in America. On November 20 Dr. Tempest Anderson will give a paper on volcanic craters and explosions. On December 4 Sir Alfred Sharpe, until recently Governor of Nyasaland, will deal with the geography and economic development of British Central Africa. On December 18 Dr. T. McDougal, of the Carnegie Institution of Washington, will contribute a paper on American deserts. In the new year Sir William Willcocks will deal with his further researches on the Garden of Eden and its restoration. Dr. Mackintosh Bell, late director of the Geological Survey of New Zealand, will describe an unknown corner of South Island. Mr. Douglas Carruthers will describe, probably in March, his travels in Central Asia. Mr. A. J. Sargent will deal with the commercial geography of the Tyne Basin, and Mr. P. A. Talbot with the journeys in the Central Sudan. In January or February a course of three lectures will be given in the afternoon on the desert of North Africa, by Captain H. G. Lyons, F.R.S. The Christmas lectures this session will be:—on January 5, by Mr. Julian Grande, on "Amongst the Alps"; on January 8, by Mr. W. Herbert Garrison, on "Our World-wide Empire"; and on January 11, "A Lady's Journeys in the Central Sudan," by Miss Olive MacLeod.

A COPY of the first monthly number of the eighth volume of *The South African Journal of Science*, being the issue for August last, has been received. The periodical is the organ of the South African Association for the Advancement of Science, and the present issue is concerned with the Bulawayo meeting of the association held in July last. The presidential address of Prof. P. D. Hahn is printed, and in it he dealt, we find, with the advance in the teaching of science during the last forty years. "There was," he said, "no professorship or lectureship for any branch of science in existence in any of the schools or colleges of South Africa forty years ago, whilst at the present time we have over sixty professors and lecturers appointed to teach certain branches of science in our colleges and technical and agricultural schools." In Section A of the association, concerned with astronomy, mathematics, physics, meteorology, geodesy, surveying, engineering, architecture, and geography, the Rev. E. Goetz was president, and took "weather forecasting" for the subject of his address, which is printed in part in this issue. The South Africa Medal and Fund, which was raised by members of the British Association in commemoration of their visit to South Africa in 1905, were presented to Dr. L. Péringuey, director of the South African Museum, in recognition of his entomological research in South Africa. The fund amounted to 50*l.* The 1912 meeting of the association is to be held at Port Elizabeth.

MR. A. HAMILTON, director of the Dominions Museum at Wellington, New Zealand, has issued a useful hand-list of pamphlets and papers containing information relating more or less directly to the Maori race, supplementing the earlier catalogue published by him in vol. xxxiii. of the Transactions of the New Zealand Institute for 1900. He has excluded from his collection anything which might be called a "book," as these are to be found in various library catalogues and bibliographies. The present list is therefore confined to detached articles, many found only in obscure sources, which supply information on this interesting people. The publication is thus of much value to students of sociology, ethnography, folk-lore, and comparative religion and mythology.

IN his paper issued by the University of London Press on the pronunciation and orthography of the Chindau dialect, one of the Bantu group, spoken in that part of south-east Africa lying to the west of Sofala, Mr. D. Jones, lecturer

in phonetics at University College, has provided a useful addition to our knowledge of African linguistics and phonology. He pleads for the general adoption of the national phonetic alphabet, because, in the first place, it is scientifically constructed on the "one sound one symbol" principle; secondly, because it is not the pet system of any single individual, but was prepared by representatives of a number of European languages; and, thirdly, because it is in more general use than any other existing system and is international. Missionaries engaged in the study of the languages of savage or barbaric tribes, and natives desirous of acquiring the correct pronunciation of English, French, or German, would be well advised to adopt it.

THE second part of vol. xi. of the Annals of the South African Museum is devoted to a continuation of Messrs. Gilchrist and Wardlaw Thompson's descriptions of Natal marine fishes. Five species, including a mullet, are described as new.

As the result of a study of the luminous organs of certain fishes, Mr. H. Ohshima, writing in the Journal of the Tokyo College of Science (vol. xxviii., art. 15, finds that whereas in sharks these structures lack definite numerical arrangement, and are merely diffuse, minute epidermal swellings partially sunk in the cutis, in the Sternoptychidæ they are arranged in a definite order and limited in number, with a complicated structure. Still greater specialisation attends these organs in the Myctophidæ, in which there may be a sexual difference in arrangement. The luminosity in sharks is faint and diffuse.

IN a continuation of his notes on zoological gardens, museums, &c., in the September *Zoologist*, Captain Stanley Flower expresses his admiration of the large size of the paddocks accorded to ungulates in the municipal menagerie at Lyons, which is further notable on account of the large amount of water running through the grounds. This establishment is open free to the public. Admiration is likewise expressed for the site of the new zoological gardens at Munich, which occupy a picturesque position on the Isar, are well timbered and watered, and contain scarped cliffs, bushy coverts, wooded ponds, and open meadows admirably suited for animals of many kinds. At the Naples Aquarium Captain Flower was interested in some living file-fishes (Balistes), which, although healthy at the time of his visit, were not likely to live long, as in confinement these fishes generally die at the approach of winter. They feed on molluscs and crustaceans, the shells of which are cracked so smartly by the powerful teeth that the sound is audible through the glass of the tank.

Biologisches Centralblatt for September 15 (vol. xxxi., No. 18) contains a preliminary account of investigations undertaken by Mr. S. Kowalewsky in regard to sex-determination in animals, the second title of the paper being the capricious determination of the sex in the germ of mammals and birds. Previous theories on the subject are reviewed, notably the opinion that poor nutrition in the female parent is conducive to the production of male offspring, and *vice versa*. Considerable importance appears to attach to this from the circumstance that, according to the author, female fœtuses are found in that portion of the ovary of guinea-pigs and rabbits which receives the greatest supply of blood, males being developed in the less richly nourished area, while where the blood-supply is still poorer the germs are infertile. It is also shown that subcutaneous injection of alcohol leads to a great preponderance of males in guinea-pigs, as does also a poverty of acid. The latter phenomenon seems connected with the fact that in races (such as Tatars and Australians) in which the females arrive early at puberty there is a marked preponderance of males over females.

WE have received two parts (Nos. 27 and 29) of Dr. F. E. Schulze's *Das Tierreich*, now in course of publication by Messrs. Friedländer. In the former Dr. F. Werner deals with the chamæleons (Chamæleontidæ), while in the latter Mr. R. von Ritter-Záhony treats of that remarkable pelagic organism known as Sagitta, and its relatives, which collectively form the group Chætognathi. The chamæleons comprise a much larger number of species than are recognised in the third volume of Mr. Boulenger's British Museum Catalogue of Lizards (1887). In the latter work forty-four species of the typical genus Chamæleon are catalogued, whereas the number is now raised to seventy-four. In 1887 the Malagasy genus Brookia was represented by three species; it now includes seven. A still greater increase occurs in the tropical African Rhampholeon, of which Mr. Boulenger recognised but two species in 1887, whereas the present author enumerates seven. The Chætognathi are classified under six generic headings, one of the genera having been named by the author during the present year; twenty species are included in the type genus, while the other genera contain from one to three. Excellent figures of the structure of these organisms are given, and the diagnosis of the group is clear and succinct, but nothing is said with regard to certain views which have been recently expressed as to the taxonomic position of the Chætognathi.

AN interesting paper on plant-inhabiting mites of a useful nature, contributed by Prof. G. F. Scott-Elliot, appears in the Transactions and Proceedings of the Botanical Society of Edinburgh (vol. xxiv., part iii.). The red spider and other inimical mites are well known, but the beneficial mites, although exceedingly common, have received less attention. Their homes, in the shape of small hollows behind hairs on the undersides of leaves on trees, are termed acarodomatia; they are not confined to dicotyledonous trees and shrubs, as was supposed, but are common on tall herbaceous plants, and the author has found them on the leaves of Solomon's Seal. With respect to their sphere of usefulness, it is asserted that they feed on scale insects, fungus spores, and other pests. The author suggests that with bacteria they help to prepare organic dust particles for the benefit of plants.

THE Quarterly Journal of the Geological Society of London for August is concerned with British zones and fossils. E. S. Cobbold and C. A. Matley respectively describe trilobites and brachiopods from the Lower Cambrian beds of Comley. D. Woolacott directs attention to the brecciation of the Permian rocks of Durham, which may be due to thrusts of Miocene age. H. Bolton brings his intimate knowledge of our Coal-measures to bear on the stratigraphy of the Bristol Coalfield. He finds that the fossils of the marine bands are of no service in marking zones. S. H. Reynolds and A. Vaughan have investigated the Avonian series of Burrington Combe in Somerset in the light of modern research, and now publish work that has extended over several years. The paper concludes with some interesting evolutionary generalisations (p. 389). The Carboniferous system receives further study from F. G. Collins, E. N. Arber, and G. C. Crick in a paper on the Culm of the Exeter district. The Lower Culm-measures are regarded as equivalent to the Midland Pendleside series. The name Culm thus becomes misleading, especially from a Continental point of view (see p. 399).

Finally, A. Wade describes Silurian rocks from near Welshpool, including some of igneous origin.

A MAP by the Edinburgh Geographical Institute, showing the density of population in Scotland as given by the census of 1911, appears in *The Scottish Geographical Magazine* for September. The method of Bosse is employed in calculating the density values, in which all uninhabited country and all urban districts and towns of 10,000 inhabitants and upwards are left out of account. Comparing it with the map setting forth the results of the 1901 census, the areas of densest population show a marked increase in spite of the reduced rate of increase of the population as a whole. The south shore of Moray Firth and the neighbourhood of Wick are also areas where population density has increased. These last two areas are connected with the fishing industry, which has improved of late, while the mining and manufacturing industries of the lowland region has drawn people to it.

THE valuable rainfall reports for the German protectorates of (1) Togoland (West Africa) for 1910, and (2) South-West Africa, for two years ended June, 1910, published by Baron v. Danckelman in *Mitteilungen aus den Deutschen Schutzgebieten* (vol. xxiv., part ii., 1911), show that in the first case the amount of rainfall was very favourable; in the coastal and central districts it was a record year, and at most of the stations the wettest since the commencement of regular observations in 1901. In the second case the rainfall for the fiscal year ended June, 1909, everywhere exceeded the average of the last ten years. The excessive amount caused an undue development of injurious insects, malaria, and sickness among cattle. In 1909–10 the amount was generally satisfactory, but not nearly so abundant as in the previous year. Rain is mostly accompanied by thunderstorms; in places thunderstorms frequently occur without rain.

A DETAILED summary of the meteorological observations made at the municipal observatory of the city of Bremen has just been published under the title "Beiträge zur Klimabeurteilung Bremens." The work is in two parts. In the first section the diurnal variations of the various meteorological elements are set out, both for the seasons and for the whole year, but the harmonic coefficients have not been determined. The second section concerns itself with monthly means and extremes, and for purposes of comparison corresponding values are given for Berlin and Frankfurt. The moderating influence of the ocean on the climate of the seaport is very strikingly brought out by this juxtaposition of figures, and the full meteorological statistics which are given for all three towns form a very useful book of reference. The work has been compiled by Prof. W. Grosse, the director of the observatory.

WE have received copies of the valuable meteorological charts of the great oceans issued by the U.S. Weather Bureau for October. The reverse sides of those for the North Atlantic and North Pacific Oceans contain interesting papers by Prof. W. J. Humphreys (1) on the origin of the permanent ocean "highs," and (2) the Aleutian and Icelandic "lows," illustrated by maps. There is a close connection between the positions and intensities of these areas and the weather of adjacent continents; they are the maxima and minima, with closed isobars, in the belts of high and low pressure, or so-called centres of atmospheric action. The subject of the importance of observations in these belts was brought before the International Meteorological Committee at the St. Petersburg meeting in 1899, and at the conference at Innsbruck, in 1905, a resolution of the Solar Commission advocating the establishment of permanent stations in the regions in question was unanimously adopted. Few attempts have been made to explain the origin of the maxima and minima; the author refers to the hypotheses put forward by Ferrel and Angot, and has supplemented them by one of his own. He concludes, *inter alia*, that a maximum ocean "high" must be at that place where the mechanical and thermal causes combine to produce the greatest result, *i.e.* a little to the west of the intersection of the coldest portion of an ocean current with a high-pressure belt.

FROM the observations of Eve at Montreal, Ashman at Chicago, and Satterly at Cambridge, it has been concluded that in each cubic metre of air near the ground there is an amount of radium emanation which would be in equilibrium with 80×10^{-12} grams of radium. This conclusion has been confirmed by observations made at Tokyo by Messrs. Kinoshita, Nishikawa, and Ono, which are described in the June number of the Proceedings of the Tokyo Mathematico-Physical Society. The amount of emanation decreases with distance from the ground, but if a homogeneous layer only 5 kilometres thick be taken as the equivalent of the whole atmosphere, over each square metre, there is an amount of emanation which would be in equilibrium with 4×10^{-7} grams of radium. Half of this breaks up in 3·7 days, and the question arises, how is the supply to be kept up? If it is derived, as it has been thought to be, from the strongly active air which exists in the pores of the soil, it must be possible to show by measurement that a large amount of emanation is exhaled from a square metre of soil. This has just been done by Prof. Joly and Mr. Smyth, who describe their observations in the August number of the Proceedings of the Royal Dublin Society. They find that near Dublin the amount exhaled often exceeds the $2\cdot9\times10^{-9}$ grams per square metre per hour necessary to maintain the atmospheric emanation.

WITH the year 1910 the *Ergebnisse der magnetischen Beobachtungen* of the Royal Observatory of Wilhelmshaven commences a new series, edited by Prof. Bidlingmaier, the assistant director. The volume extends to forty-five pages, and possesses two charts. It contains an account of the absolute and self-recording instruments. At present the latter consist of declination (D) and horizontal force (H) magnetographs of the Kew pattern by Adie, but a vertical force instrument seems under construction. The methods of observation and reduction, and the base values of the curves, are treated in great detail. One reason for this doubtless is that, following the example of Potsdam, mean values are assigned to every day of the year, which go to 1γ in H and to 0·1′ in D. Again, following Potsdam, the hourly values represent mean ordinates from sixty minutes centring, not at exact hours of the day, but at half hours. Mean diurnal inequalities are given for individual months, going to 0·01′ in D and to 0·1γ in H and in the north and east components. Corresponding values are also given in the case of the components for the Fourier 24, 12, 8, and 6-hour terms. The last two pages give vector diagrams for the diurnal inequality for individual months. In the diagrams and diurnal inequalities use is made of all days, whether quiet or disturbed, which probably explains the rather striking irregularities in the diagrams. While the influence of Potsdam example is manifest in the more normal parts of the volume, the treatment of disturbances affords scope for the ventilation of Dr. Bidlingmaier's own methods of treatment.

THE experimental study of vortex rings has in the past been qualitative rather than quantitative; but, according to

the Journal of the Franklin Institute for September, Dr. E. F. Northrup, of Princeton University, has so materially improved the apparatus used in their production that accurate observations of them may now be made. A coloured ring of liquid is projected from the opening in the front of a metal box by a blow struck by an electro-magnet on the back, and travels through a transparent liquid, which gradually decolourises the projected liquid. If the box is pointed slightly upwards, the issuing vortex ring is reflected on reaching the surface of the liquid, the angle of reflection being apparently equal to that of incidence. By the use of two liquids of different densities in the observing tank, refraction may also be shown. While, however, the actual matter of the vortex ring is carried forward into the second liquid if the density of the latter is greater than that of the ring, this is not the case if the ring is denser than the liquid into which refraction is about to take place. By projecting molten paraffin wax into cold water, solid rings can be obtained. A subsequent number of the Journal will contain photographs of rings in a variety of conditions.

WE have received from the authors, Messrs. H. R. Hamley and A. L. Rossiter, a copy of a paper on the magnetic properties of stalloy, reprinted from the Proceedings of the Royal Society of Victoria. The remarkable magnetic properties of stalloy—essentially an iron-silicon alloy containing 3·4 per cent. of silicon—have already been investigated very fully in this country, principally by methods involving the use of a wattmeter; the present research emanates from two Government research scholars working in the University of Melbourne, and the methods used are entirely different, since they depend upon Prof. T. R. Lyle's method of tracing out the wave-forms. This application of Lyle's method is interesting, and it is satisfactory to find that the results substantially confirm those obtained by the wattmeter methods.

THREE interesting equilibria are discussed in the Memoirs of the College of Science and Engineering of the Kyoto Imperial University, the third volume of which is now being issued. In the case of sodium acetate dissolving in acetic acid solutions of different strength, the complete equilibrium diagram for 20° C. plotted by R. Abe shows the existence of three salts having the formulæ

$$NaC_2H_3O_2,3H_2O;\quad NaC_2H_3O_2,C_2H_4O_2,\quad \text{and}\quad NaC_2H_3O_2,2C_2H_4O_2.$$

In the case of sodium and potassium carbonates dissolving in water at 25° C., Y. Osaka finds that the only double salt which can exist in contact with its solution at that temperature is the salt $Na_2CO_3,K_2CO_3,12H_2O$. In the case of the system water, ethyl alcohol, ethyl ether, studied by S. Horiba, physical methods of analysis were adopted, the composition of the phases being determined from measurements of density, refractive power, and viscosity. The critical composition at which the two phases become identical was found to be: water 40 per cent., alcohol 28·4 per cent., ether 31·6 per cent., for a temperature of 25° C.

SOME months ago attention was directed in these columns to a paper by Flint in *The American Journal of Science*, in which he claimed to have separated, by fractional precipitation of tellurium tetrachloride, a portion of the tellurium with an atomic weight so low as 124·32. This method of resolution had already been tried some years previously by Baker and Bennett, but without success. In view of the results recorded by Flint, Prof. Baker repeated his experiments in collaboration with Prof. Vernon Harcourt, and found once more that no resolution could be effected by this method. In describing their experiments in the Journal of the Chemical Society, these authors explain the probable origin of the anomalous results of the American observer. In recovering the tellurium which they had used, they noticed that an orange-coloured precipitate was formed from material that had previously been quite white. This yellow precipitate was found to be tellurium trioxide, which had been produced by the oxidising action of hydrochloric acid previously exposed to bright sunlight, and thereby contaminated with chlorine. A basic nitrate prepared from the trioxide and analysed by Flint's method gave (on the assumption that the tellurium was present as dioxide in the form $2TeO_2,HNO_3$) an atomic weight so low as 118·31, instead of the normal value 127·54. There can be little doubt, therefore, that the low figures given by Flint were due to oxidation of the material, and not to any resolution of the element.

THE City of Paris depends upon its supply of fuel, food, and other commodities to a large extent on the traffic carried by water, the quantity brought into the city by this means of transport being greater than by the railways. Ever since the formation of the Manchester Ship Canal, the question of rendering the Seine between Rouen and Paris navigable for sea-borne vessels has been in agitation. The serious inundations that occurred in the lower parts of Paris about a year ago again directed attention to the condition of the river, and a commission was appointed by the Minister of Public Works to report on the matter. Recently this commission has presented its report. The question of making the river navigable for sea-borne vessels, and making Paris a seaport, is not, however, dealt with, the commission being of opinion that the present conditions of traffic can be considerably improved by the works proposed for dealing with the prevention of overflow and inundations. The widening and deepening of the channel in some parts where required, and the construction of a new channel across the bend between the Rivers Marne and Seine below Paris, proposed by the flood commission, would be of great service to the traffic. A large sum of money has already been expended in enlarging and improving the locks and the channel between Rouen and Paris, and boats carrying more than 200 tons can navigate the waterway.

COMMENTING on the wreck of the naval airship at Barrow on September 24, *The Engineer* for September 29 believes that had this vessel survived a few months longer even the Admiralty officials responsible for her inception would have become convinced that the airship in general is a hopelessly impracticable affair. The vessel will in all likelihood be repaired; indeed, even already there is news to this effect. Sufficient has not yet been done, our contemporary supposes, to justify the official abandonment of the whole idea. *Engineering* of the same date is more sympathetic, and considers that it would be a mistake to attach too much importance to the accident. The airship is still, like the aëroplane, in an experimental stage; and the Admiralty airship must be regarded as a great practical experiment, in which the results of trial and error, when carefully analysed, must yield important lessons. The material used for the outer envelope proved of high resisting quality, only yielding when there was abnormal tension. The duralumin girder-work proved very ductile and of great tensile strength against the racking stresses set up. The material of which the ballonets are made, as supplied through the War Department, has all along been a source of uncertainty and of little accidents, and the facts point to the cause of the collapse being due to the rupture of a gas-bag when the vessel was being drawn out of the shed.